

Atty. Dkt. No. 200313138-1

REMARKS

This Reply is in response to the Office Action mailed on February 9, 2006 in which claims 18, 33 and 45 were objected to and in which claims 1-17, 19-32 and 34-44 were rejected. With this response, claims 20-22, 24, 26, 38 and 45 are canceled; claims 1, 3-4, 7-8, 19, 23, 25, 34, 37, 39 and 41-44 are amended and claims 46-47 are added. Claims 1-19, 23, 25, 27-37, 39-44 and 46-47 are presented for reconsideration and allowance.

I. Examiner Interview Summary

On May 4, 2006 and May 8, 2006, telephonic interviews were held between Examiner Pape and Applicants' attorney, Todd A. Rathe. The objection to the title, the objection to the drawings and the rejection of claim 1 based upon DiBene was discussed. Although no agreement was reached, Applicants which thank Examiner Pape for the opportunity to discuss the rejections.

II. Objection to the Specification

Paragraph 1 of the Office Action objected to the title of the invention is not being descriptive. In response, the title is amended to now read --MULTI-HEAT SINK ARRANGEMENT --. Applicants respectfully requests withdrawal of the objection to the title.

III. Objection to the Drawings

Paragraph 2 of the Office Action objected to the drawings by asserting that the third device, the third heat sink, the third array of fins, the fourth device, the fourth heat sink on the fourth array of fins are not shown in the drawings. However, as discussed during the Examiner interview held on May 8, 2006, this assertion is incorrect. Figure 1 illustrates an arrangement of four processor components 24. Figure 3 illustrates one of the components 24 in more detail. Thus, Figures 1 and 3, together, illustrate each of the elements recited in claim 14. Accordingly, Applicants request that the objection to the drawings be withdrawn.

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IV. Rejection of Claims 1-2, 4-8, 13, 15, 19, 20-23, 27, 29, 30-32, and 34-44 under 35 USC 102(B) Based upon DiBene

Paragraph 3 of the Office Action rejected claims 1-2, 4-8, 13, 15, 19, 20-23, 27, 29, 30-32, and 34-44 under 35 USC 102(b) as being anticipated by DiBene II et al. US Patent 6,356,448. Claims 20-22 and 38 are canceled. Claims 1-2, 4-8, 13, 15, 19, 23, 27, 29, 30-32, 34-37 and 39-44, as amended, overcome the rejection based upon DiBene.

A. Claim 1

Claim 1, as amended, recites a computing system which includes a second array of fins extending at least partially across a first array of fins, wherein the first array of fins includes consecutive fins that extend from the base in a first direction and that form a transverse channel therebetween extending in a second direction perpendicular to the first direction and having opposite transverse open ends. Support for this amendment is at least found in Figures 4 and 5 of the present disclosure. Thus, no new matter is added.

DiBene fails to disclose or suggest a second array of fins which extend at least partially across a first array of fins, wherein the first array of fins includes consecutive fins forming a transverse channel therebetween having opposite transverse open ends. The Office Action characterizes the material between plated through holes 168 of DiBene as "fins". However, even assuming, arguendo, that such could be properly characterized as "fins," the material between plated through holes 168 of DiBene do not provide consecutive fins that form a transverse channel therebetween having opposite open ends. Accordingly, claim 1, as amended, overcomes a rejection based on DiBene. Claims 2-18 depend from claim 1 and overcome the rejection for the same reasons.

B. Claim 4

Claim 4, as amended, recites that the second device comprises a processor assembly including a central processing unit and wherein the second base is configured to conduct heat

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from the central processing unit to the second array of fins without conducting heat to the first base.

DiBene fails to disclose a second base configured to conduct heat away from a central processing unit of a processor assembly to an array of fins without conducting heat to a first base of another heat sink. As noted in the Office Action, DiBene discloses a processor 108 and a power pod 118. (See Office Action page 5). To transfer heat from processor 108 to fins 144, heat transfer device 126, heat transfer device 128 and heat spreader 106 (characterized by the Office Action as the second base) must first to conduct heat to base 146. As a result, claim 4, as amended, overcomes the rejection based upon DiBene for this additional reason.

C. Claim 7

Claim 7, as amended, depends from claim 1 and further recites that the first array of fins extends over the first base which overlaps the first device and wherein the first device comprises a power pod assembly.

DiBene fails to disclose a first array of fins that extends over the first base which overlaps the first device, wherein the first device comprises a power pod assembly. In contrast, the only base disclosed by DiBene that overlaps power converter 118 (characterized as a power pod) is base 146. The only fins that extend over base 146 are fins 144. DiBene fails to disclose a second array of fins that extend at least partially across fins 144. Thus, claim 7, as amended, overcomes the rejection based upon DiBene for this additional reason.

D. Claim 8

Claim 8, as amended, recites that the second array of fins overlaps opposite sides of the first device.

DiBene fails to disclose or suggest an array of fins that overlaps opposite sides of a device. Fins 144 clearly do not overlap opposite sides of power converter 118 or processor 108.

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The material between plated through holes 168 (characterized as an array of fins by the Office Action) clearly does not overlap opposite sides of either device 108 or device 118. Thus, claim 8, as amended, overcomes the rejection based on DiBene for this additional reason.

E. Claim 19

Claim 19 is amended to incorporate the limitations of former dependent claim 26 and each of the intervening claims 20, 21, 22 and 24. Former dependent claim 26 was rejected based upon a DiBene and additionally based upon Connors, US Patent 6,626,233. Claim 19, as amended, recites a second array of fins that extends at least partially across a first array of fins. Claim 19 further recites a heat pipe which extends from below the first base to above the first array of fins.

Neither DiBene nor Connors, alone or in combination, disclose a second array of fins which extends at least partially across the first array of fins and a heat pipe that extends from below the first base to above the first array of fins. As acknowledged by the Office Action, DiBene fails to disclose a heat pipe. As a result, the Office Action attempted to additionally rely upon Connors in its rejection of former claim 26. However, nowhere does Connors disclose a heat pipe that extends from below a base to above fins supported by the same base. In contrast, Connors discloses a lower evaporator section 102 coupled to processor and an upper evaporator section 104 coupled to power supply 20. Lower evaporator section 102 does not extend above fins 36. Likewise, upper evaporator section 104 does not extend above fins 36. Even assuming, *arguendo*, that it would be obvious to add a heat pipe to the arrangement of DiBene, the resulting hypothetical combination would at best result in a heat pipe extending across fins 144. No teaching or suggestion exists for somehow adding a heat pipe that extends from below base 146 to above fins 144. Accordingly, claim 19, as amended, overcomes the rejection based on DiBene. Claims 23, 25 and 27-33 to 10 from claim 19 and overcome the rejection for the same reasons.

F. Claim 34

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Claim 34, as amended, recite a processor module in which a first heat sink overlaps a power pod and a second heat sink thermally coupled to a heat transfer surface of a processor extends at least partially across the first heat sink.

DiBene fails to disclose or suggest a first heat sink that overlaps a power pod and a second heat sink thermally coupled to a processor and extending at least partially across the first heat sink. In contrast, although DiBene does disclose a heat sink 142 overlapping a power pod (power converter 118), nowhere does DiBene disclose any other heat sink which extends at least partially across heat sink 142. Accordingly, claim 34, as amended, overcomes rejection based on DiBene. Claims 35-36 depend from claim 34 and overcome the rejection for the same reasons.

G. Claim 37

Claim 37, as amended, recites a module including a power supply, a processor, first means for dissipating heat emitted by the power supply while not substantially receiving heat from the processor and second means for dissipating heat emitted by the processor, wherein the second means extends at least partially across the first means.

DiBene fails to disclose or suggest a first means for dissipating heat emitted by power supply while not substantially receiving heat from the processor and a second means for dissipating heat emitted by a processor, when the second means extends at least partially across the first means. In contrast, DiBene merely discloses a heat sink 142 for dissipating heat from power converter 118 (characterized by the Office Action as the power pod). Heatsink 142 receives heat from processor 108. DiBene specifically states that "PTHs 168 can be adjusted in size and number to vary the thermal conductivity of the pass of multiple devices 108 on a single first PCB 102 to the common 'isothermal' heat sink assembly 142." (Column 5, lines 22-26). Accordingly, claim 37, as amended, overcomes the rejection based upon DiBene.

H. Claim 39

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Claim 39, as amended, recites a heat dissipating arrangement including a heat sink having fins thermally coupled to a first device and overlapping opposite sides of a second device.

DiBene fails to disclose a heat sink having fins thermally coupled to a first device and overlapping opposite sides of a second device. In contrast, neither fins 144 nor the material between plated through holes 168 (characterized by the Office Action as fins) overlap opposite sides of a device. Accordingly, claim 39, as amended, overcomes the rejection based upon DiBene. Claim 40 depends from claim 39 and overcomes the rejection for the same reasons.

I. Claim 41

Claim 41, as amended, recites a first heat sink comprising a heat dissipating structure having fins configured to be thermally coupled to a first heat emitting device while extending at least partially around and on opposite sides of a second heat sink which is coupled to a second heat emitting device.

DiBene fails to disclose or suggest a heat sink having fins configured to be thermally coupled to a first heat emitting device, where the fins extend at least partially around and on opposite sides of a second heat sink thermally coupled to a second heat emitting device. In contrast, neither fins 144 nor the material between plated through holes 168 (characterized by the Office Action as fins) overlap opposite sides of a device. Accordingly, claim 41, as amended, overcomes the rejection based on DiBene.

J. Claim 42

Claim 42, as amended, recites a heat sink comprising at least one heat dissipating structure configured to be thermally coupled to a first heat emitting device while extending at least partially around and on opposite sides of a plurality of fins of a second heat sink thermally coupled to a second heat emitting device.

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DiBene fails to disclose or suggest a heatsink which extends at least partially around and on opposite sides of fins associated with another heat sink. Heat sink 142 of DiBene does not extend at least partially around and on opposite sides of the material between plated through holes 168 (characterized by the Office Action as fins). Accordingly, claim 42, as amended, overcomes the rejection based upon DiBene.

K. Claims 43

Claim 43, as amended, recites a method which includes directing heat generated by a first device through a first array of fins extending across and around at least a portion of a second device so as to dissipate heat on opposite sides of the portion of the second device.

DiBene fails to disclose a method in which heat generated by first device is directed through an array of fins extending across and around at least a portion of a second device. In contrast, neither fins 144 nor the material between plated through holes 168 (characterized by the Office Action as fins) extend across and around at least a portion of a second device to dissipate heat on opposite sides of the device. Accordingly, claim 43, as amended, overcomes rejection based on DiBene.

L. Claim 44

Claim 44, as amended, depends from claim 43 and further recites that the second device includes a second array of fins which are nested within the first array of fins.

DiBene fails to disclose a first array of fins nested within a second array of fins. Thus, claim 44, as amended, overcomes rejection based on DiBene for this additional reason.

V. Rejection of Claims 3, 28 and 14 under 35 USC 103(a) Based on DiBene

Paragraph 4 of the Office Action rejected claims 3, 28 and 14 under 35 USC 103(a) as being patentable over DiBene. Claims 3, 28 and 14 depend from claims 1, 19 and 1,

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respectively, and overcome the reductions for the same reasons discussed above with respect to DiBene.

Claim 3 depends from claim 1 which recites that the second array of fins extend at least partially across a first array of fins and that the first array of fins are thermally coupled to a first base. Claim 3 further recites that the first base overlaps the first device and that the first device generates heat at a first rate and the second device generates heat at a second greater rate.

DiBene fails to disclose or suggest a second array of fins that extends at least partially across the first array of fins coupled to a first base that overlaps the first device, wherein the first device generates heat at a first rate and the second device generates heat at a second-greater rate. As acknowledged by the Office Action, processor 108 generates more heat than power converter 118. The only base disclosed by DiBene that overlaps the first lesser heat generating device, power converter 118 of DiBene, is base 146. Fins 144 extend from base 146. DiBene fails to disclose another array of fins which extends at least partially across fins 144. Thus, claim 3, as amended, overcomes the rejection for this additional reason.

VI. Rejection of claims 3, 9-12, 24-26 and 28 under 35 USC 103(a) based upon DiBene and Connors

Page 7 of the Office Action rejected claims 3, 9-12, 24-26 and 28 under 35 USC 103(a) as being patentable over DiBene in view of all US Patent 6,626,233. Claims 24 and 26 are canceled. Claims 3, 9-12, 25 and 28 depend from claims 1 and 19, respectively and overcome the rejection for the same reasons discussed above with respect to claims 1 and 19. Connors fails to satisfy the deficiencies of DiBene

Claim 3, as amended, is further patentably distinct over DiBene and Connors. Claim 3 depends from claim 1 which recites that the second array of fins extend at least partially across a first array of fins and that the first array of fins are thermally coupled to a first base. Claim 3

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further recites that the first base overlaps the first device and that the first device generates heat at a first rate and the second device generates heat at a second greater rate.

Neither DiBene nor Connors disclose or suggest a second array of fins that extends at least partially across the first array of fins coupled to a first base that overlaps the first device, wherein the first device generates heat at a first rate and the second device generates heat at a second-greater rate. As acknowledged by the Office Action, processor 108 generates more heat and power converter 118. The only base disclosed by DiBene that overlaps the first lesser heat generating device, power converter 118 of DiBene, is base 146. Fins 144 extend from base 146. DiBene fails to disclose another array of fins which extends at least partially across fins 144. Thus, claim 3, as amended, overcomes the rejection for this additional reason.

VII. Rejection of Claims 16 and 17 under 35 USC 103(a) Based on DiBene and Brewer

Page 9 of the Office Action rejected claims 16 and 17 under 35 USC 103(a) as being compatible over DiBene in view of Brewer et al. US Patent 6,522,536. Claims 16 and 17 depend from claim 1 and overcome the rejection for the same reasons discussed above with respect to claim 1. Brewer fails to satisfy the deficiencies of DiBene.

VIII. Added Claims

With this response, Claims 46 and 47 are added. Claims 46 and 47 are presented for consideration and allowance.

A. Claim 46

Claim 46 depends from claim 1 and further recites that the first base is horizontally spaced from and beside the second base. Neither DiBene nor the prior art of record disclose a first base horizontally spaced from and beside a second base. Accordingly, claim 46 is presented for consideration and allowance.

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B. Claim 47

Paragraph 5 of the Office Action indicated that claim 18 would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims. In response, claim 18 is rewritten as claim 47 and includes all the limitations of base claim 1. Accordingly, added claim 47 is presented for consideration and allowance.

IX. Conclusion

After amending the claims as set forth above, claims 1-19, 23, 25, 27-37, 39-44 and 46-47 are now pending in this application.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 08-2025. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 08-2025. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 08-2025.

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Respectfully submitted,

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